

Groups 1 to 4 include all the principal Stalked Lichens which can be expected in the New York area, with the exception of a very few small and rare ones offering special difficulties. The last species of *Cetraria* are not exactly stalked, and there are included in the Papery Lichens (Groups 5 to 12) a few species perhaps comparable in form, as already noted. In Group 11 are some highly variable forms difficult to classify, and kept together because their algal parts, mostly *Nostoc*, give them a characteristic water-soaked or gelatinous appearance in shades of black, dark green, dark brown and blue-gray, very different from the greenish gray or yellow tints of most of the larger lichens.

RIDGEWOOD, N. J.

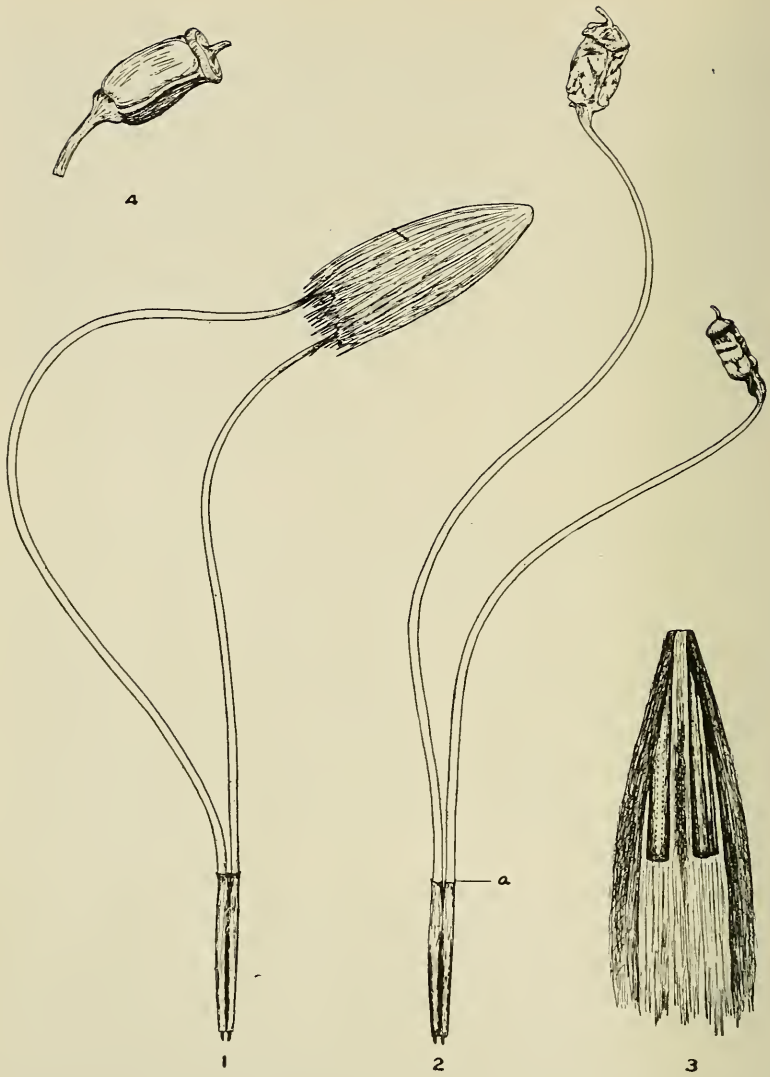
An apparent double-sporophyte in *Polytrichum commune* L.

HENRY N. ANDREWS, JR.

Although the occurrence of abnormalities, such as "double-sporophytes," in the mosses is not common, judging from the accounts of the relatively few students who have concerned themselves with them, one would expect that more careful field examination of large numbers of individuals would bring to light more numerous cases. The relatively inconspicuous nature of the moss habit is probably the chief reason for the few cases on record.

Györfy (1934) and Schimper (1861) have described and illustrated double-sporophytes in several genera of mosses including *Orthotrichum*, *Homalothecium*, *Anomodon*, *Bryum*, *Brachythecium*, *Mnium*, and *Buxbaumia*. In all of these cases the two thecae have a common seta—division of the latter taking place well above its point of union with the gametophyte. The specimens described by these authors appear to have been collected when mature and after the calyptra had been lost—at least there is no mention of the latter in their accounts. As will be shown below the calyptra may be of considerable significance in determining the true ontogenetic morphology of the teratological form in question.

The two most plausible explanations of this phenomenon are



Polytrichum commune L.

- Fig. 1. Two sporophytes enclosed within an apparently single calyptra. (5×)
 Fig. 2. The sporophytes after removal of the calyptra; *a*, point at which the archegonia were torn by the elongating sporophytes. (5×)
 Fig. 3. The calyptra split longitudinally, showing the two calyptra-proper contained within the outer hairy covering. (7×)
 Fig. 4. A normal mature theca. (5×)

as follows: doubling may arise either from the fertilization of two eggs contained within one archegonium: or two archegonia (or young sporophytes) may partially fuse during their early development. The second explanation is, as Schimper has pointed out, more likely and such is readily proved to be the case in the specimen described below.

Polytrichum commune L.

The specimen was collected by the author on the high open moorland in eastern Belgium about 10 kilometers north of Malmedy (in the province of Malmedy), Belgium, in July, 1938. It is now in the Herbarium of the Missouri Botanical Garden, St. Louis. (#1140623)

The two thecae were enclosed in what appeared to be a single calyptra and are shown in figure 1. One seta is somewhat shorter than the other and its theca is correspondingly diminutive (fig. 2). The sporophytes were not mature at the time of collection which accounts for the rather shrunken and wrinkled appearance of the young thecae after drying. Figure 4, a normal mature theca, has been included for comparison.

Examination of the setae has shown that the apparent fusion is quite superficial and actually involves only the basal portions of the old archegonia, the fringa at *a* (fig. 2) representing the point at which the neck was torn from the remainder of one archegonium.

The most interesting feature of the specimen, however, is to be found in the calyptra. Although slightly larger, it is externally quite similar in size and form to those enclosing normal thecae. Dissection of the calyptra, however, revealed the true nature of its origin beyond a doubt, for instead of a single calyptra-proper contained within the hairy covering, *two* are present (fig. 3). In this figure the hairy cover has been split open to the apex in order to show the distinctly unfused nature of the two calyptra.

The explanation of this phenomenon is then clear, and the apparent doubling undoubtedly took place as follows: two adjacent archegonia became superficially fused in the region of their venters; as the setae elongated and began to carry aloft their respective archegonial necks or calyptra the latter remained sufficiently close together to be enclosed by a common

hairy covering. The growth of one sporophyte proceeded at a more rapid rate than that of the other resulting in their unequal size (shown in figure 2). Unequal growth of the setae starting at a very early stage caused them to become slightly separated and probably accounts for the fact that they have not taken part in the twinning.

It is to be hoped that more teratological specimens such as the particularly interesting cases figured by Schimper (1861) may be discovered at earlier stages in development in order that the true nature of those in which the setae are nearly or completely fused may be known.

The writer is indebted to Professor Armand Renier, Chief of the Mine Service of Belgium, and to certain other Belgian scientists, whose kind assistance made possible many collecting trips in that country.

Literature cited

- Györfy, I. 1934. Doppelte Mooskapseln aus Frankreich. *Rev. Bryologique et Lichenologique* 7: 117-121.
 ———, 1936 *Polytrichum* Abnormitäten aus der Hohen-Tátra. *Acta Biologica* 4: 123-132. Schimper, W. Ph. 1861. Observations sur Quelques Cas de Teratologie Bryologique. *Bull. Bot. Soc. France* 8: 351-353.

WASHINGTON UNIVERSITY
 SAINT LOUIS, MO.